United States
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Soil
Conservation
Service

Cape May Court House,
New Jersey

CEREAL RYE

1986

Annual Report

of the Cape May

Plant Materials Center

A Summary of the North Atlantic Coastal Area Activities

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INTRODUCTION

This report covers the plant materials activities of the Cape May Plant Materials Center for calendar year 1986. Established in 1965, the Cape May PMC is located approximately 24 miles south of Atlantic City, New Jersey on US Route 9. The property is comprised of a total of 88 acres. The area served by the Center includes the mid-Atlantic coastal plain and the piedmont extending from Cape Cod, Massachusetts to Cape Hatteras, North Carolina. The Major Land Resource Areas in each state are listed below:

Massachusetts
- 143 - Northeastern Mountains
- 144A - New England and Eastern New York Upland, Southern Part
- 144B - New England and Eastern New York Upland, Northern Part
- 145 - Connecticut Valley
- 149B - Long Island, Cape Cod Coastal Lowland

Connecticut
- 144A - New England and Eastern New York Upland, Southern Part
- 145 - Connecticut Valley

Rhode Island
- 144A - New England and Eastern New York Upland, Southern Part

New York
- 149B - Long Island - Cape Cod Coastal Lowland

New Jersey
- 144A - New England and Eastern New York Upland, Southern Part
- 148 - Northern Piedmont
- 149A - Northern Coastal Plain

Maryland
- 148 - Northern Piedmont
- 149A - Northern Coastal Plain
- 153B - Tidewater Area
- 153C - Mid-Atlantic Coastal Plain

Delaware
- 153C - Mid-Atlantic Coastal Plain

Virginia
- 133A - Southern Coastal Plain
- 136 - Southern Piedmont
- 153A - Atlantic Coast Flatwoods
- 153B - Tidewater Area
- 153C - Mid-Atlantic Coastal Plain

North Carolina
- 133A - Southern Coastal Plain
- 136 - Southern Piedmont
- 153A - Atlantic Coastal Flatwoods
- 153B - Tidewater Area

Purpose and Objectives of the Cape May PMC

To develop and promote the use of new and improved plants for the conservation of soil, water and related resources. To develop sound culture methods and management techniques for the effective use of plants and soils.

Function

-- Collect and initially evaluate new plant materials to include native collections, foreign plant introductions and strains from plant breeders.

-- Increase seed/plants of potential new releases.

-- Make advanced evaluations of selected accessions under simulated field conditions in comparison with a standard variety.

-- Determine cultural requirements of needed plant materials.

-- Make field evaluation plantings on problem sites off the center, in order to obtain information of plants at sites typical of eventual use.

-- Provide plant propagules for field plantings in soil and water conservation districts where final evaluation of a new plant is made.

-- Develop, name and release new varieties in cooperation with the New Jersey Agricultural Experiment Station and other cooperating agencies.

-- After release, maintain and produce breeder or foundation seed or stock at the center in accordance with standards of the cooperating agency.

Identified Problems for the Cape May PMC Service Area in Order of Priority

1. Cropland Erosion.
2. Erosion Along Sounds and Tidal River Banks.
3. Stabilization of Man-made Critical Areas.
4. Stabilization of Sand Dunes.

DESCRIPTION OF AREA

The soils, topography, climate, and land use combine to produce a distinct plant resource area. The soil-forming materials include glacial outwash and underlying beds of sand, gravel, silt, and clay. Active sand dunes exist along the coast, wind erosion occurs on sandy cultivated fields, water erosion is a problem on sloping cropland and stream bank erosion threatens the tidal estuaries. The soils vary from excessively well drained to poorly drained and swampy. There are large tracts of tidal marsh around bays, river inlets and the ocean.

Topographic relief ranges from large areas of level or slightly sloping land to less extensive sections of moderately rolling ridges. The relatively level coastal plain rises from sea level to elevations of more than 600 feet in the piedmont. Level to gently undulating topography characterizes the coastal plain while in the piedmont, gentle slopes and steep ridges are predominant.

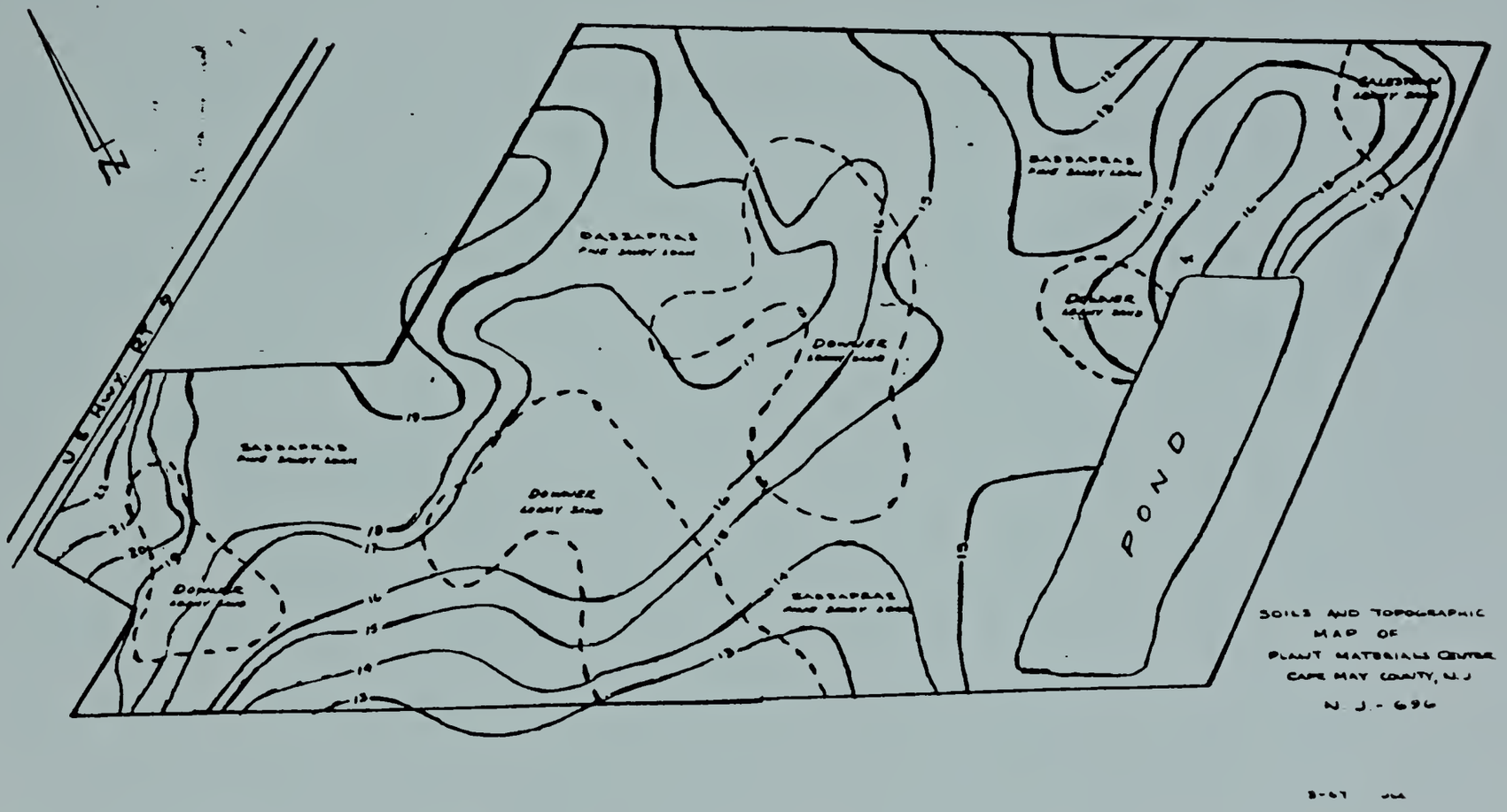
The climate is tempered by the Atlantic Ocean. There are wide fluctuations in annual precipitation, and to a lesser extent, in temperature. Drought years do occur and tropical hurricane storms are common. Mean annual precipitation in the area ranges from 38 to 46 inches. The frost-free season varies from 170 to 250 days. Length of growing season is affected by latitude and elevation. The Cape May PMC Service Area includes Plant Hardiness Zones 5-9.

Agricultural operations are predominantly cash row crops, orchards, truck crops, specialty crops, and poultry. Livestock enterprises have disappeared from many farms with a switch to continuous cultivated crops. This trend to cash crop operations has reduced the use of hay and pasture plants in the cropping systems. Clean cultivation on large tracts of land has increased soil erosion. The problem is especially prevalent on large open areas of flat sandy soils and all sloping land during periods of less than adequate soil cover.

Non-agricultural activities play a dramatic role in the use of conservation plants. There are large areas in hardwood and pine forests, much of which is neither managed for timber or wildlife. Extensive areas of tidal marsh are vital to the seafood and wildlife resources. Also, sand and gravel mining, expanding land transportation systems, increasing recreational facilities and construction of industrial, as well as residential developments, are all areas where plants can be used to stabilize disturbed areas.

Fifteen percent of the nation's population lives within commuting distance of the area served by the Center, which creates demands for concentrated recreational facilities. An extensive summer resort industry has expanded into a year-round enterprise. Demand for space is so great that large areas of marshland are being considered for development which will intensify the pollution problem.

CAPE MAY PLANT MATERIALS CENTER PROPERTY



Soils and Elevation Map

Legend:

------ = Soil boundary.

15 = Elevation above sea level in feet.

Soils:

Sassafras - fine sandy loam

Downer - loamy sand

Galestown - loamy sand

DOWNER LOAMY SAND, 0 to 5 percent slopes

Nearly level to gently sloping well-drained soils that have a loamy sand surface and sandy loam subsoil. Natural fertility and available water holding capacity is moderate. Permeability is moderately rapid. This soil is subject to severe wind erosion when exposed in fields. Irrigation is generally needed when growing vegetable crops.

GALESTOWN LOAMY SAND, 0 to 5 percent slopes

This nearly level to gently sloping well-drained soil has a thick sand surface soil exceeding 20 inches. It has a sandy loam subsoil. Natural fertility is low and available water capacity is moderate. Sandy surface is droughty. Permeability is rapid in the upper 2 ft. and moderate in the sandy loam subsoil.

SASSAFRAS SANDY LOAM, 0 to 2 percent slopes

Nearly level well-drained soils that have sandy loam surface soils and sandy clay loam subsoils. It has medium natural fertility. This soil has moderate permeability and is subject to minor wind and water erosion. Irrigation is generally needed during extended dry periods.

WEATHER RECORDS AT CAPE MAY PLANT MATERIALS CENTER FOR 1986

1986 Month	Air Temperature °F						4" Soil Temperature °F						Precipitation			
	Maximum			Minimum			Maximum			Minimum			Total	Devi-	Greatest	No.
	Ext.	Av.	Deviation		Av.	Ext.	Ext.	Av.	Deviation		Av.	Ext.	Inches	ation	Daily	Days
Jan.	67	44	+4	+2	25	6	45	40	+1	-1	36	35	4.18	+0.82	1.95	9
Feb.	61	40	-2	+1	26	12	44	40	+1	+2	39	36	3.44	+0.22	.75	16
March	74	54	+4	+1	33	14	60	49	+2	+2	44	37	1.54	-1.87	.94	6
April	75	60	0	0	41	29	66	58	+2	0	51	49	4.00	+0.59	1.29	13
May	93	74	+5	+1	52	33	78	71	+5	+1	62	59	.72	-3.07	.40	2
June	93	83	+5	+1	61	43	85	82	+6	+3	74	70	1.99	-1.37	.86	7
July	98	86	+2	+3	68	51	91	89	+7	+7	84	75	3.06	+0.39	1.82	8
Aug.	92	82	+1	-2	63	40	92	82	+1	+2	78	69	3.40	-0.50	1.03	10
Sept.	89	76	-1	0	58	40	78	74	-2	0	71	66	1.95	-0.63	1.95	10
Oct.	90	69	+3	0	48	33	78	66	+1	+2	63	57	3.46	+0.06	1.51	6
Nov.	78	57	+4	-2	37	15	63	55	+1	+1	52	46	4.61	+1.03	.88	12
Dec.	63	48	+2	+2	31	14	54	46	+1	0	43	39	5.63	+1.70	1.28	9
1986	98	64			45	6	92	62			58	35	37.98	-2.63	1.95	108
Normal*		62			45			61			57		41			

*Normal based on:

21 yr. Air Temperature Average; 17 yr. Soil Temperature Average; 21 yr. Precipitation Average.

Frost free days 184 - April 16 to October 17, 1986 - Normal 191 days.

9.7 inches of snow were measured; this fell between Jan. 28th and February 27th.

PERSONNEL

Manager	Donald W. Hamer
Soil Conservationist	Harold E. Yohn
Soil Conservationist	Noel J. Murray
Foreman	Wilson J. Merrick
Secretary	Barbara A. Turnier
Soil Conservation Aid	James Layton (to August 29, 1986)
Contract Employee	Peter McFadden (from Sept. 10-Dec. 12, 1986)

OTHER SPECIALISTS

David G. Lorenz, NENTC Plant Materials Specialist

Cluster R. Belcher, NJ Plant Materials Specialist

Stephen K. Salvo, NC Plant Materials Specialist

CAPE MAY PMC STATE CONSERVATIONISTS' ADVISORY COMMITTEE

Joseph C. Branco, NJ State Conservationist

Bobbye Jack Jones, NC STC

George Norris, VA STC

Rex Tracey, MA STC

PROJECT ACTIVITIES

Cropland erosion and damage to crops by both wind and water have been identified as the major plant materials problem in the area serviced by the Cape May PMC. Stabilization of sand dunes, tidal banks and critical areas continue to receive attention in designated areas. The following section describes the active projects at the Cape May PMC. These project studies have been carried out in the interest of protecting the quality and quantity of our nation's natural resources and are arranged in order of priority.

Trade names used herein are for convenience only. No endorsement of products is intended, nor is criticism of unnamed products implied.

1. Cover Crop Assembly The search for a superior winter cover crop species began in 1983. The Cape May PMC is one of several PMC's participating in this project. The objective of this project is to select and release one or more winter hardy cultivars. The primary use of these cultivars will be on conventionally tilled soybean and corn fields, silage fields and land used to grow speciality crops such as tobacco, peanuts and vegetables. Ideally, these cultivars would be adapted to overseeding into standing crops and would not interfere with harvest operations while providing adequate cover before cold temperatures retard growth. Alternatively, any cold tolerant cultivar which could be seeded after crop harvest is desirable.

   Two hundred fifty accessions of cover crop species were seeded at the PMC about October 2, 1985. Fifteen of these accessions were various Brassica spp., which produced the most rapid soil cover, averaging 40% cover by October 31. This increased to 60% cover by November 26, but the cover began to deteriorate with the cold weather. By mid-February, an average of only 30% cover remained.

   Three accesions of Secale cereale included in this assembly produced an average of 50% cover by November 26 and continued growth despite the cooler weather, providing 75% soil cover by mid-February.

2. Winter Cover Crop Species for Erosion Control in Spring Planted Vegetable Fields

   Wind erosion is a serious problem in the vegetable farming areas along the Atlantic Coastal Plain. The most critical problem is the airborne movement of sand particles across fields during periods of sparse soil cover. This can damage young plants by shredding leaves and breaking stems, and may cause death if the seedlings are uprooted or buried. The objective of this project is to evaluate several winter cover

crop species along with various vegetable planting techniques to select a method or methods which will enhance vegetable crop production while reducing soil erosion.

In the fall of 1985, wheat, barley, rye and spring oats were established in 75' x 150' blocks. The following spring, one-half of each block was sprayed with Round-up to kill the cover crop. The other half of the block had 30 inch wide strips tilled through the live grain, leaving 18" strips of grain between each tilled strip. Tomato plants were either no tilled into the killed grain residue or transplanted into the tilled strips. As a control, two plots were conventionally tilled and prepared before tomatoes were transplanted.

In the strip-tilled treatments, a strip of grain 1.5' wide was left between the cultivated strips. The live grain strip offered the young tomato plants shelter from damaging winds and wind blown sand. These plants were generally larger and produced more and larger fruit than those in the no-till and conventionally tilled treatments. Tomato plant height was about equal to grain height. Rye was the tallest growing cover crop and the tallest, most vigorous tomato plants grew in the rye.

The tomato plants in the no-till treatments did not do as well as those in the strip-till treatment. This was partially attributed to the lack of protection from the wind and windblown sand. The grains, with the exception of the oats, were 4-6" high when they were sprayed. The residue deteriorated rapidly in the following two weeks. The oat plots in the no-till treatments produced the best tomato plants possibly because they offered slightly more protection to the tomatoes since they had grown taller than any other grain in the fall. The plants in the control treatments exhibited the least vigor.

3. Overseeding of Cover Crops into Conventionally Tilled Soybeans

Soil erosion on conventionally tilled soybean fields after harvest is a severe problem. Plant residue left on fields after harvest often provides inadequate protection for most soils during the winter. Conventionally planted cover crops are usually seeded too late to produce enough growth to effectively protect the soil surface. Since 1983, the Cape May PMC has been evaluating several cover crop species to determine their potential for use as a cover crop species which can be aerially seeded into standing soybeans and the seeding date which provides the most effective winter cover.

In the fall of 1985, five species were overseeded by hand in a manner which simulated aerial seeding. There were four seeding dates on 15 day intervals which began August 15. The species used were 'Aroostook' cereal rye (Secale cerale), annual ryegrass (Lolium perenne multiflorum), crimson clover (Trifolium incarnatum), hairy vetch (Vicia villosa), and oats (Avena sativa). Black medic (Medicago lupulina) had been used in prior years but it was eliminated because of poor performance.

By December 1985, the best soil cover was from annual ryegrass (87% average) seeded on September 16, and Aroostook (87% average) seeded on October 1. Both species provided better than 70% cover for all seeding dates except the first date. The other species produced poor ground cover at this date.

By March 1986, the ground cover produced by Aroostook had either increased or remained the same as in December. The ground cover produced by annual ryegrass declined in most cases due to cold temperatures. Annual ryegrass, however, produces an extensive soil binding root system.

4. No Till Cropping Systems

No till farming methods have made significant progress in reducing soil erosion in the corn and soybean farming areas of the Atlantic Coastal Plain. The benefits of no-till could be multiplied if crops were no-tilled into a living legume cover crop. This method would expose little soil surface and nitrogen would be provided to the crop.

During 1986, the Cape May Plant Materials Center began investigating the possibility of no tilling corn into established stands of 'Lathco' flatpea. Various combinatons and rates of several herbicides were used to suppress the growth of the flatpea to facilitate the establishment of no-till corn.

Results from this year's trial show that such a cropping system may have merit. Despite dry weather, corn grain yields ranged from 91 to 110 bushels/acre and silage yields ranged from 11.9 to 15.8 tons/acre. No fertilizer was applied to the corn and irrigation was limited to 1 inch applied in June. The best corn yield was obtained from the plots treated with a mixture of Paraquat (1 qt/acre) and Banvel (6.5 oz/acre). This plot averaged 110 bu/acre.

5. 'Tinga' Tangier Flatpea for Soil Protection

In 1986, the Cape May PMC, along with several other PMC's, began evaluations on 'Tinga' Tangier flatpea for soil protection. This native of Morocco is a short-lived annual legume. It is anticipated that this species can either be fall seeded or spring seeded as a cover crop. The purpose of this study is to determine the area of adaptation of Tinga.

Two plantings were made for this project. The first planting was in early June. One month after seeding, the plants were 6-12 inches tall and exhibited very good vigor. At maturity in early September, the average percent ground cover was 43%. In November, there was some evidence of reseeding but not very much. Some of the young seedlings remained alive in late December despite several hard frosts.

The fall planting of Tinga was seeded on September 8th. It produced only 10 percent soil cover by December and it never bloomed. Frost damage in mid-November reduced the amount of ground cover and had a severe effect on the vigor of the plants but did not appear to kill them. Many remained alive in late December.

6. Evaluation of Annual Species for Windbarriers

FINAL REPORT

Wind erosion can be a serious problem for vegetable farmers on the Atlantic-Coastal Plain. Crops which have recently emerged or been transplanted are susceptible to costly damage from wind blown sand which can tear leaves, break stems, expose roots and even bury some juvenile plants. Wind-swept sand can, also, be deposited in other undesirable locations, such as roads and farmsteads. The objective of this project is to evaluate annual species for use as effective temporary windbreaks in vegetable and other high value crops on soils where wind erosion is a problem.

Two rye varieties and six of wheat were seeded in early October of 1984 and 1985. Two fifty foot strips of each variety were planted in a manner which simulated a wind barrier. One strip was at the recommended seeding rate (2.5 bu/Acre rye, 2.0 bu/A wheat) and the other strip at half the recommended rate (1.25 bu/A rye, 1.0 bu/A wheat). The barriers consisted of three rows spaced 10 inches apart and were planted perpendicular to the prevailing westerly winds. The varieties of rye were 'Aroostook' and 'Balbo'. Wheat varieties included 'Houser', 'Ticonderoga ', 'Frankenmuth', 'Yorkstar', 'Purcell' and 'Pioneer 2550'.

The barriers were evaluated in the spring and summer. Growth for the wheat and rye was similar in mid-March, ranging from 2 to 4 inches in height. By mid-April, the rye varieties averaged 16 inches in height and wheat varieties grew to an average of 7.5 inches. Rye obtained maximum height in May but the wheat continued to grow until June. For two consecutive years, Balbo rye averaged 2 inches taller than Aroostook with heights of 53 and 51 inches, respectively. Houser was the tallest wheat variety with an average height of 30.5 inches. Frankenmuth and Ticonderoga were almost equal at 28.5 and 28 inches, respectively. Yorkstar and Pioneer 2550 were even at 27.5 inches and Purcell was the shortest at 26.5 inches.

Birds caused lodging of the barrier strips when they began feeding on the maturing grain in early July. In 3 out of 4 cases over the two year study, the grain barriers planted at the recommended rate were slightly taller than those seeded at half rate.

CONCLUSION

The general rule of thumb for figuring the distance of effective control of a windbreak is a 1 to 10 ratio. For every 1 foot of height about 10 feet of open field space is protected. Based on similar densities, rye had an advantage over the wheat.

Small grain barriers may be less effective for protecting early planted vegetables such as lettuce and spinach than for later planted crops like tomatoes, peppers, eggplant, sweet corn and similar crops. Wheat barriers would have to be planted closer than rye for the same protection.

Table 1

Evaluations of Annual Species for Windbarriers, 1985 1/

Accession	Planting Rates (BU/A)	1985 Stem Heights(in.) 2/ 5/15	7/3	8/2	1985 Effective Wind Erosion Control 5/15	6/21	7/3	8/2
'Balbo'	2.5	58	50	21	3	3	4	8
Secale cereale	1.25	57	48	17	4	4	5	8
'Aroostook'	2.5	53	47	18	3	3	4	8
S. cereale	1.25	54	51	16	4	4	4	8
'Houser'	2	30	28	17	4	4	8	9
Triticum vulgare	1	30	29	17	5	5	9	9
'Frankenmuth'	2	26	27	18	5	5	7	9
T. vulgare	1	23	28	13	6	6	8	9
'Ticonderoga'	2	28	21	10	5	5	9	10
T. vulgare	1	26	23	16	6	6	8	9
'Yorkstar'	2	28	25	22	5	5	7	9
T. vulgare	1	26	23	6	7	7	10	10
'Pioneer 2550'	2	30	24	16	5	5	6	9
T. vulgare	1				6	6	7	10
'Purcell'	2	27	25	14	5	5	8	9
T. vulgare	1	24	25	12	6	6	9	10

1/Annual windbarriers seeded on October 10, 1984; Data recorded May 15 to August 2, 1985.

2/Values are an average of 4 measurements taken from each 50 foot of row.

3/Ratings are: 1=Excellent; 3=Good; 5=Fair; 7=Poor; 9=Very Poor; 10=None.

Table 2

Evaluations of Annual Species for Windbarriers, 1986 [1]

Accession	Planting Rates (BU/A)	1986 Stem Heights (in.) [2]				1986 Effective Wind Erosion Control [3]		
		3/11	4/11	5/14	6/12	5/7	6/16	7/9
'Balbo'	2.5	4	20	52	51	4	3	4
Secale cereale	1.25	3	19	49	50	5	4	5
'Aroostook'	2.5	4	17	49	48	3	3	5
S. cereale	1.25	3	17	50	47	5	4	6
'Houser'	2	3	7	20	33	7	5	9
Triticum vulgare	1	3	8	22	32	8	6	9
'Frankenmuth'	2	4	8	21	30	7	5	8
T. vulgare	1	3	7	14	30	8	6	8
'Ticonderoga'	2	4	10	23	31	7	5	6
T. vulgare	1	3	9	21	30	7	6	7
'Yorkstar'	2	4	8	21	30	7	7	8
T. vulgare	1	3	7	20	29	8	8	8
'Pioneer 2550'	2	3	8	21	27	7	5	6
T. vulgare	1	2	8	21	28	8	5	7
'Purcell'	2	4	7	18	29	7	6	9
T. vulgare	1	3	7	19	27	8	7	9

1/Annual windbarriers seeded on October 10, 1985; Data recorded March 11 to July 9, 1986.

2/Values are an average of 4 measurements taken from each 50 foot of row.

3/Ratings are: 1=Excellent; 3=Good; 5=Fair; 7=Poor; 9=Very Poor.

7. Forage Value of 'Atlantic' Coastal Panicgrass

FINAL REPORT

'Atlantic' coastal panicgrass (*Panicum amarum* var. *amarulum*), was jointly released in 1981 by the Soil Conservation Service and the New Jersey Agricultural Experiment Station. It is a tall growing multi-stemmed, warm-season grass characterized by excellent seedling vigor and prolific seed production. It thrives on fertile, well drained sites but also produces satisfactory stands on sandy, droughty infertile sites which makes it an excellent plant for stabilization of sand dunes and drastically disturbed areas.

In 1984, the Cape May Plant Materials Center began a two-year study to determine the forage value of Atlantic and the effect of nitrogen (N) fertilization on the forage composition. The study took place in the Atlantic seed production field at the PMC. The three treatments were: 0 lbs. N, 50 lbs. N/acre, 100 lbs. N/acre. The treatments were replicated three times in a randomized plot. Samples representing the initial harvest of forage were taken in mid-July. The forage from a 3' x 3' block was cut from each treatment. In the fall, (October 16, 1984, September 26, 1985) another 3' x 3' block was sampled to represent a late initial harvest, and the regrowth from the first cutting site was also harvested.

The one hundred pound test produced the greatest forage yield and the highest percentage IVDMD (In Vitro Dry Matter Disappearance), ranging from 42.31% to 42.59% for the initial harvest in mid-July. Crude protein content ranged from 6.40% to 7.62% (See Tables 3&4). As N fertilization decreased, IVDMD and percent crude protein decreased. Forage yields increased with time but forage quality decreased. Accurate determination of the forage value of the regrowth cannot be made from this study because very little regrowth occurred, probably because of excessive shading from the neighboring plants. Generally, the regrowth had a higher percentage of crude protein but the IVDMD decreased.

Table 3

FORAGE QUALITY OF 'ATLANTIC' COASTAL PANICGRASS (PANICUM AMARUM VAR. AMARULUM)

1984 Data

	REP	Dry Matter (tons/A) A 1/	B 2/	C 3/	Dry Matter Percent Digestibility A	B	C	Percent Protein A	B	C
0# N Applied	I	1.7	0.8	0.3	40.11	28.47	25.04	5.06	4.56	5.81
	I	1.5	1.1	0.2	42.93	29.70	26.60	5.56	3.81	6.06
	II	2.5	3.0	0.2	38.17	30.69	26.74	5.56	3.81	7.31
	II	1.6	2.6	0.4	40.35	30.84	26.31	5.81	4.06	7.06
	III	2.0	3.5	0.2	36.47	27.91	24.98	5.06	3.31	5.81
	III	2.6	3.8	0.3	39.74	26.70	22.25	6.31	3.31	5.31
	Avg.	2.0	2.5	0.3	39.63	29.05	25.32	5.56	3.81	6.23
50# N Applied	I	2.0	4.4	0.03	42.56	26.12	27.83	7.56	3.81	9.63
	I	2.5	2.9	0.2	40.61	26.57	27.59	6.56	3.56	7.31
	II	1.9	5.0	0.1	42.32	28.66	26.83	6.94	3.31	6.31
	II	2.5	2.6	0.4	40.08	27.69	25.31	7.06	4.06	7.31
	III	3.2	4.7	0.5	39.62	25.35	23.45	6.06	3.81	5.94
	III	3.1	4.6	0.4	33.95	26.97	23.32	6.44	3.69	5.81
	Avg.	2.5	4.0	0.3	39.86	26.89	25.72	6.77	3.69	7.05
100# N Applied	I	2.0	5.8	0.2	39.99	28.79	24.52	6.56	3.81	5.94
	I	2.6	7.4	0.2	42.36	27.94	22.94	7.81	4.19	6.06
	II	2.1	5.6	0.2	41.71	28.25	22.46	5.56	3.64	6.81
	II	3.1	6.0	0.3	43.96	26 13	26.28	8.94	4.19	9.00
	III	3.5	7.5	0.1	42.48	26.95	28.31	8.31	4.56	6.81
	III	3.4	4.8	0.5	43.38	27.16	23.58	8.56	4.06	7.06
	Avg.	2.8	6.2	0.3	42.31	27.54	24.68	7.62	4.08	6.95

1/Harvest date 7/24/84. Initial Harvest.
2/Harvest date 10/16/84. Initial Harvest.
3/Harvest date 10/16/84. Regrowth since July Harvest.

Data received from The Pennsylvania State University Forage Lab.

Table 4

FORAGE QUALITY OF 'ATLANTIC' COASTAL PANICGRASS (*PANICUM AMARUM* VAR. *AMARULUM*)

1985 Data

	REP	Dry Matter (tons/A) A [1]	B [2]	C [3]	Dry Matter Percent Digestibility A	B	C	Percent Protein A	B	C
0# N Applied	I	4.4	3.9	0.8	39.92	27.62	26.39	5.13	3.94	4.56
	I	-	4.2	-	-	29.64	-	-	3.56	-
	II	4.9	5.3	<0.1	41.97	26.39	36.38	4.63	3.88	6.19
	II	-	5.0	-	-	25.98	-	-	3.88	-
	III	4.1	4.7	<0.1	40.48	28.43	36.75	4.63	3.31	10.75
	III	-	4.0	-	-	29.36	-	-	3.50	-
	Avg.	4.5	4.5	0.3	40.79	27.90	33.17	4.80	3.68	7.17
50# N Applied	I	5.1	4.4	<0.1	45.63	27.48	44.19	7.94	5.56	11.44
	I	-	4.4	-	-	27.85	-	-	5.00	-
	II	4.0	6.5	<0.1	40.84	24.07	31.46	5.19	4.81	6.44
	II	-	7.6	-	-	24.03	-	-	4.19	-
	III	5.6	6.3	<0.1	40.66	24.75	33.07	5.13	6.13	7.00
	III	-	5.1	-	-	28.44	-	-	5.31	-
	Avg.	4.9	5.7	0.1	42.38	26.10	36.24	6.09	5.17	8.29
100# N Applied	I	5.9	5.6	<0.1	42.16	25.61	-	6.19	5.63	11.69
	I	-	5.0	-	-	25.36	-	-	5.25	-
	II	4.3	6.0	<0.1	43.21	25.82	-	7.00	5.25	9.06
	II	-	6.8	-	-	22.65	-	-	5.81	-
	III	5.4	7.4	<0.1	42.41	23.53	35.76	6.00	5.81	8.50
	III	-	5.3	-	-	23.23	-	-	5.81	-
	Avg.	5.2	6.0	0.1	42.59	24.37	35.76	6.40	5.59	9.75

1/Harvest date 7/19/85 Initial Harvest.
2/Harvest date 9/26/85 Initial Harvest.
3/Harvest date 9/26/85 Regrowth since July Harvest.

Data received from The Pennsylvania State University Forage Lab.

8. Spartina alterniflora for Tidal Bank Stabilization

The banks of coastal sounds and river estuaries exposed to storms and subject to tidal action are a severe erosion problem. The problem is acute in Virginia, North Carolina and Maryland and to a lesser extent in Delaware and New Jersey. Previous efforts to solve this problem were directed towards engineering structures and transplanting native cordgrasses from nearby marshes along eroding tidal areas. Since 1977, the Cape May PMC has been involved in projects to solve this problem with vegetation. These efforts have been concentrated on saline waters and were divided into two phases: 1)the stabilization of the intertidal zone, and 2)the vegetation of the beach area above the tidal zone. The later resulted in the release of 'Avalon' saltmeadow cordgrass (Spartina patens) in 1986.

The second objective of the project is to select a vigorous strain of smooth cordgrass for planting on banks of saline tidal waters. Smooth cordgrass (Spartina alterniflora) is the natural grass for stabilizing the intertidal zone of saline waters along the mid-Atlantic Coast. The PMC assembled 111 accessions in 1977. Evaluations at on-center and off-center tidal sites resulted in the reduction of seven accessions in 1985. In 1986, four superior accessions were evaluated at the center and at four off-center tidal sites.

It is apparent that potted plants have a higher survival rate than bare-root plants. The potted plants possess more vigor and exhibit a faster establishment rate than the bare-root plants.

9. Assembly of Uniola paniculata

Sea oats (Uniola paniculata) is a warm-season perennial grass native to the frontal dunes along the Gulf and lower Atlantic Coasts. The northernmost stand of this species occurs just north of the Chesapeake Bay. The species has an excellent sand stabilizing ability due to a bunch type growth habit, thick leaves and dense fibrous roots. Sea oats have been reported to be slow to establish following transplanting, but becomes persitant with time. Presently, there are no known serious diseases or insect problems associated with this species. In 1982, the Cape May PMC began an assembly of sea oats with the objective of selecting a cold tolerant strain.

A sand dune planting in Virginia Beach, Virginia was established in 1985. Thirty-six of the fifty-three accessions survived the winter at this location. Vigorous regrowth in 1986 made evaluations difficult due to the spreading of accessions into adjacent plots. Many accessions flowered by mid-July. No further evaluations will be made on this site but it will be maintained as a demonstration plot.

Two off-center plantings were established in 1986. One was on Asseateague Island Wildlife Refuge, near Chincoteague, Virginia and the other at Fenwick Island, Delaware. At Assateague, most accessions produced rapid and vigorous growth within three months of the transplanting date. The excellent performance of the sea oats may be the result of slow release fertilizer applied at transplanting time and the large size of the transplant. Native seedlings are normally very slow to establish.

The Fenwick Island, Delaware Planting was not as successful as the Asseateague site because many plants were blown out by shifting sand. This planting will be re-established in 1987.

At the PMC, twenty-five three-year-old accessions flowered. Several accessions produced viable seed. All accessions at the PMC had been mulched each fall to provide protection during the winter months. Several of the accessions appear promising but none seem as vigorous as when that accession is grown on a sand dune.

10. Evaluation of Panicum amarum

Bitter panicgrass (Panicum amarum) is a semi-prostrate, thick-stemmed, warm season perennial grass. The species is found naturally on foredunes and backdunes from Delaware and southward. It is an excellent sand stabilizer, particularly when grown with other sand stabilizing species. The objective of this project is to select a superior cultivar adapted to Delaware and southward along the mid-Atlantic Coast.

The Cape May PMC began evaluating forty-two accessions in 1983. By 1986, seven accessions remained in the project. Two more accessions were eliminated from the assembly in 1986 due to poor performance. Prior to 1986, the standard of comparison was a southern cultivar, 'Sunset'. This cultivar is not adapted to northern climates, and was replaced by another southern cultivar, 'Ocracoke'.

11. Evaluation of Solidago sempervirens

Seaside goldenrod (Solidago sempervirens)is a salt tolerant perennial forb that often grows in association with American beachgrass. It is well adapted to the entire dune area along the mid-Atlantic coast. Individual plants may consist of several unbranched stems up to one meter tall that grow in open stands. The objective of this project is to select a superior cultivar which may be used as a complimentary plant with American beachgrass and other species for sand dune stabilization.

Seventy-nine accessions were established at the Cape May PMC in 1982. Subsequent evaluations resulted in the selection of twenty-eight promising accessions. The 1986 evaluation data justified the retention of sixteen accessions. Some of the better performing accessions are 9030157, 9030148, 9002802, and 9027032. They possess a tall growth habit and were all rated good to excellent for foliage abundance, uniformity and vigor.

12. Woody Plants for Sand Dune Stabilization

American beachgrass is a pioneer plant and is not well adapted on back dune areas. Drifting sand from these areas can develop into serious problems. Back dunes usually become vegetated with woody species naturally, but sometimes this is a slow process especially where man interferes. Superior selections of adapted woody plants are not readily available from commercial nurseries.

The objective of this project is to select superior woody cultivars adapted to the back dune areas in MLRA 149 and 153. This project began in 1979 when one hundred ninety-one accessions of four woody species were collected along the coastal plains from Georgia to Massachusetts. The species included (1) beach plum (Prunus maritima), (2) rugosa rose (Rosa rugosa), (3) wax myrtle (Myrica cerifera), and (4) bayberry (M. pensylvanica),

Presently, the assembly includes ten accessions of bayberry, eleven accessions of beach plum, twelve accessions of rugosa rose and one accession of wax myrtle. Selections were based upon percent survival, abundance of foliage, growth rate, vigor and other significant characteristics. This spring, twelve rose accessions were established in a poly-cross block at the Cape May PMC. This will become the Breeder's Block.

13. Ammophila breviligulata Longevity Planting

American beachgrass (Ammophila breviligulata) is the plant most often used for initial sand dune stabilization along the mid-Atlantic coast. The 'Cape' variety is clearly the superior cultivar north of the Chesapeake Bay. Cape and other cultivars have exhibited a tendency to decline in vigor and eventually die in some locations even where recognized management techniques are followed. The objective of this project is to determine the need for another cultivar of beachgrass to effectively stabilize sand dunes along the entire mid-Atlantic coast. Cape, 'Bogue' and 'Hatteras' varieties of American beachgrass were used in the plantings. These are the commonly used cultivars within the PMC service area for stabilization of sand dunes.

The Cape May PMC is responsible for evaluating two plantings in the Virginia Beach, Virginia area. One planting established in 1984 is at the Back Bay Wildlife Refuge.

During 1986, all three varieties continued to perform well despite heavy sand accumulation on the plots caused by storms.

The other planting established in 1985 is at the Fort Story Army Base. In May, all three strains of beachgrass began to exhibit signs of decline. Bogue showed the most pronounced symptoms. The plants exhibited symptoms similar to drought stress. Initially, the decline was assumed to be caused by insects. Inspection of the dying culms continued throughout the growing season. By September, Bogue was almost dead. Cape was 80% dead and Hatteras was reduced by over 50%.

At this time, there is no positive explanation why the Fort Story Planting declined and the Back Bay Planting did not. The main difference between the planting sites is their location on the dunes with respect to the water. The Fort Story Planting is on a back dune, approximately 700 feet from the Chesapeake Bay. It receives little sand accumulation. The Back Bay Planting is on a frontal dune 100' from the ocean, where it is subject to periodic sand deposition and salt spray. It is, also, possible that the decline was related to the dry conditions during 1986.

14. Two Herbaceous Species Interplanted into Three Strains of Ammophila breviligulata

American beachgrass (Ammophila breviligulata) is used for initial stabilization of sand dunes along the mid-Atlantic coast. At many locations, stands deteriorate and eventually die several years after planting due to unexplained reasons. The sites must be either spot planted or completely replanted to maintain effective dune cover. Some of these sites cannot be immediately replanted successfully.

The Cape May PMC has been working with Japanese sedge (Carex kobomugi) and bitter panicgrass (Panicum amarum) for several years. These two species are excellent sand stabilizers, but both are slow to establish. The purpose of this planting is to determine if one or both of the herbaceous plants can be permanently established on the dune before the beachgrass declines, thus eliminating the need to replant beachgrass.

In 1985, the PMC established a planting at the Fort Story Army Base, Virginia Beach, Virginia. These two herbaceous species were interplanted with 'Cape', 'Bogue' and 'Hatteras' varieties of American beachgrass. In May of 1986, the three varieties of beachgrass began to show signs of decline, particularly Bogue. The plants exhibited symptoms similar to drought stress. The cause was thought to be insect infestation. By September, only 3% of Bogue, 20% of Cape, and 38% of Hatteras remained alive.

Survival rates for the two herbaceous species were poor. The surviving plants have not yet developed a stand as is

characteristic of both species. Japanese sedge produced 5-10% cover while bitter panicgrass has less than 5% cover. Japanese sedge was much more vigorous than the bitter panicgrass.

15. Carex kobomugi Transplanting Technique

Poor survival of transplanted plants is one of the main reasons that 'Sea Isle' Japanese sedge (Carex kobomugi) a semi-prostrate perennial has not been accepted as a sand stabilizing plant despite its tough, grasslike leaves and thick rhizomes. It is believed that low sand mositure around the planting unit may be a major reason for poor survival. Another reason may be accidental damage to immature buds.

In the spring of 1985, Sea Isle was transplanted on the dunes of Wildwood Crest, New Jersey. In a replicated trial, half of the planting units were treated with super slurper, a moisture holding soil additive, before planting. Control plants were transplanted without any treatment. More plantings were established in a similar manner at Wildwood Crest and Barnegat Light, New Jersey in the fall of 1985, and a spring 1986 planting was established at Barnegat Light.

First year evaluations of the various plantings indicated that fall transplanted Sea Isle plants had better survival than spring transplanted plants. It was also noted that survival of control plants was slightly better than those plants which had been treated with super slurper. There was, however, very little difference in the vigor of the surviving plants between the two treatments.

16. Pest Resistant Plants for Secondary Sand Dune Stabilization

'Cape' American beachgrass (Ammophila breviligulata) has a tendency to deteriorate on backdune sites which makes it unsuitable for use as a permanent cover on these areas. Since 1978, the Cape May PMC has been evaluating several salt tolerant species for persistance on backdune sites. Currently, only the Duck, North Carolina Planting is active.

Under low fertility conditions, Japanese sedge (Carex kobomugi) and saltmeadow cordgrass (Spartina patens) were clearly superior to Cape as well as other species in the planting.

In 1985, the plots were split. One-half of each plot was fertilized with 500 lbs/Acre of 10-10-10 to evaluate the effect of fertilizer. In the spring of 1986, percent cover, vigor and spread were much improved on the fertilized subplots. Sea Isle Japanese sedge exhibited an excellent stand and was rapidly spreading with less vigorous rhizomes

in two of the three replications. Rhizome spread tended to be toward the ocean and into the fertilized areas of neighboring plots.

Cape had died in two of the three reps, but where plants survived, better stands developed in the fertilized subplots and these plants exhibited better vigor than the control plants. The control plants possessed a large quantity of dead material.

In one fertilized subplot, saltmeadow cordgrass (PI-421239) exhibited an excellent stand and good vigor.

Documentation of a Plant Accession Selected for Advanced Testing

Species:	*Prunus maritima* (Marsh.)
Common Name:	Beachplum
Plant Symbol:	PRMA2
Accession Number(s):	9013172, 9011251, 9011275, 9012013
Origin:	Delaware, Massachusetts, New Jersey and New York
Method of Selection:	Selected from an original assembly of 28 accessions. Selected for superior vigor, development rate, foliage, abundance and distribution, disease and insect resistance and fruit production.
Description:	A densely branched shrub from 2-7 feet high. Shape may vary from low to straggling to ascending particularly if exposed to salt spray pruning. Flowers are white and about 1/2 inch in diameter. Fruit is blue to purple averaging 3/4 inch diameter.
Anticipated Conservation use:	A woody, sand stabilizing, back dune plant and possible source of wildlife food.
Potential Area of Adaptation:	Atlantic coastal plain primarily in back dune beach areas from New England to Maryland. Additional trials will be conducted to determine its adaptation to more southern locations.
Potential Soil Adaptation:	Sand dunes, fine and coarse textured sandy soils and organic soils.
Where Plants Will Be Maintained:	Cape May Plant Materials Center
Prepared By:	H. E. Yohn, Soil Conservationist, Cape May PMC December 9, 1986

Documentation of a Plant Accession Selected for Advanced Testing

Species:	*Panicum amarum* Elliott
Common Name:	Bitter panicgrass
Plant Symbol:	PAAM2
Accession Number(s):	9038994, 9030179, 9039029, 9039030, 9039032
Origin:	9038994 from Virginia; 9030179 from Delaware; 9039029, 9039030 and 9039032 from North Carolina.
Method of Selection:	These accessions were selected for their cold tolerance, good growth and vigor; disease and insect tolerance; and good foliage production and uniformity. They were selected from 42 accessions evaluated at the Cape May Plant Materials Center.
Description:	Bitter panicgrass is a slow growing perennial, warm seasoned grass. It has thick stems and an extensive rhizome system which makes an excellent sand dune stabilizing plant. Native plants on sand dunes are most vigorous south of Maryland. The species is believed to produce viable seed only south of Virginia.
Anticipated Conservation use:	The intended use is for sand dune stabilization in combination with American beachgrass and other sand stabilizing plants or by itself.
Potential Area of Adaptation:	Coastal dunes and sandy shores from Connecticut to Florida and Texas.
Potential Soil Adaptation:	Sand dunes, fine and coarse textured sandy soils and organic soils.
Where Plants Will Be Maintained:	Cape May Plant Materials Center
Prepared By:	H. E. Yohn, Assistant Manager, Cape May PMC September 16, 1986

Documentation of a Plant Accession Selected for Advanced Testing

Species:	*Rosa rugosa* (Thunb.)
Common Name:	Rugosa rose
Plant Symbol:	RORU
Accession Number(s):	9002787, 9008310, 9008311, 9011255, 9011256, 9011257, 9011260, 9011278, 9015508, 9015509, 9015510, 9011261
Origin:	Massachusetts, New Jersey and Delaware 9011260 collected in Maryland.
Method of Selection:	Selected from an original assembly of 48 accessions. The accessions were selected for their superior survival, vigor, disease and insect resistance and foliage abundance.
Description:	A multi-branched, erect shrub which can grow 4-5 feet in height. Plants have thick stems covered with many thorns. The dark green leaves are compound with fine leaflets. The plants flower throughout the summer. Flowers are 2 to 3 inches across and although usually red in color can range from white to purple. Fruit resembles small red tomatoes varying in size from 1/2 inch to 1 1/2 inches in diameter. The primary method of spreading is by underground stems which produce a colony effect in a few years.
Anticipated Conservation use:	The intended use is to provide climax vegetation for stabilization of back dune areas and possible wildlife habitat.
Potential Area of Adaptation:	Rugosa rose has a wide range of adaptability and it is found almost everywhere in the northeastern United States. It grows best in sandy, fine textured soils, but it also does well in medium textured soil.
Potential Soil Adaptation:	Sand dunes, fine and coarse textured sandy soils and organic soils.
Where Plants Will Be Maintained:	Cape May Plant Materials Center
Prepared By:	H. E. Yohn, Soil Conservationist, Cape May PMC December 9, 1986

1986 PMS ACTIVITIES OF NC, SC AND VA

In 1986, the Cape May Plant Materials Center provided extensive support to the plant material programs of the Mid-Atlantic States. Thirteen requests for plant materials were filled by the center: four for South Carolina, three for Virginia and six for North Carolina.

In South Carolina, 'Cape' American beachgrass, 'Atlantic' coastal panicgrass and 'Sea Isle' Japanese sedge went into field plantings for dune restoration. Foundation quality material of these plants and VA-70 shrub lespedeza was also provided for nursery production.

In North Carolina, field plantings of 'Atlantic' coastal panicgrass for dune restoration and critical area stabilization have shown positive results. Foundation quality seed of 'VA-70', 'Atlantic' and 'Cape' was also provided for production.

In Virginia, the Virginia Beach Field Office received the bulk of the plants for continued field evaluation plantings. Rugosa rose, 'Avalon', 'Atlantic' and 'Lathco' went into field plantings for tidal bank and dune restoration. 'Rem-red' Honeysuckle went into production.

CAPE MAY PMC

1986 SEED PRODUCTION

Name	Acc. No.	Production (Lbs.)
Brassica campestris	Various	<1
B. napus	Various	<1
B. pekinensis	Various	<1
Berberis koreana	PI-44324	4
Bromus arvensis	Various	<1
Bromus unioloides	9053915	<1
Glycine max		2520
Juniperus virginiana	Various	4
Lathyrus hirsutus	Various	<1
Lespedeza thunbergii	'VA-70'	404
Lolium perenne	Various	3
L. perenne multiflorum	Various	2
M. lupulina	Various	<1
Panicum amarum	'Atlantic'	345
Panicum virgatum	PI-421138	280
Prunus maritima	Various	13
Secale cereale	'Aroostook'	5371
Trifolium pratens	9047065	<1
T. repens	Various	<1
T. subterraneum	Various	<1
Vicia grandiflora	Various	<1
V. villosa	Various	14
Vulpia myuros	Various	3

CAPE MAY PMC

1986 PLANT PRODUTION

Name	Acc. No.	Production (No.)	
Ammophila breviligulata	'Cape'	200,000	
" "	'Hatteras'	735	
" "	'Bogue'	735	
" "	9047071	85	
" "	9047072	300	
" "	9047073	300	
Berberis koreana		12	
Carex kobomugi	'Sea Isle'	4,275	
Cynodon dactylon	'Tufcote'	50	(bushels)
Elaeagnus umbellata	PI-421132	500	(Cuttings)
Juniperus conferta	'Emerald Sea'	150	(Potted)
" "		700	(Cuttings)
Panicum amarum	Various	1,800	
Phalaris arundinacea	269728	1,000	(plugs)
Rosa rugosa	Various	1500	(Seedlings)
" "	"	144	(Root suckers)
Solidago sempervirens	Various	520	
" "	9002882	192	(Potted)
Spartina alterniflora	Various	1,500	(Bare-root)
" "		1,210	(Potted)
S. patens	'Avalon'	100,000	(Bare-root)
" "	Various	160,000	(Bare-root)
Tomatoes	Commercial	2,400	
Uniola paniculata	Various	2,365	(Potted)

Plants Available for Commercial Seed or Plant Production

1. 'Atlantic' Coastal Panicgrass (*Paniucum amarum* var. *amarulum*)

'Atlantic' is a tall, robust, native warm season perennial grass. Its growth habit is upright, with stems reaching a height of 4 to 6 feet. The plants have the appearance of a bunch grass, although they produce short rhizomes. Atlantic has strong seedling vigor and reliable seed production under cultivation. It performs satisfactorily on sandy, droughty infertile soils and on heavy imperfectly drained soils.

The principle use of Atlantic is for stabilizing disturbed sandy sites. It can be direct seeded on sand dunes except for active frontal dunes. It has also been successfully established on surface mined areas, sanitary land fills, dredged spoil fills, sand and gravel mines, road side embankments and similar disturbed areas. While most stands of Atlantic are established by drilling the seed, small areas can be vegetated with seedling plants.

Field tests show Atlantic to be well adapted in the coastal plain and piedmont region from Massachusetts to Texas. It has also been grown inland in Pennsylvania and Ohio. Atlantic's resistance of the stems to lodging and its seed production also enhance its value as food and cover for wildlife.

It was cooperatively released by the Soil Conservation Service and the New Jersey Agricultural Experiment Station in 1981. Limited quantities of seed are available for commercial production.

2. 'Sea Isle' Japanese Sedge (*Carex kobomugi*)

Japanese sedge has been introduced onto the dunes from New Jersey south to Virginia. It is native to northeastern Asia and exhibits several desirable characteristics for stabilizing sand dunes. Japanese sedge, a salt tolerant tufted plant, differs from most related sedges by growing in dryer areas. The plant, which grows 8 to 10 inches tall, spreads primarily by short rhizomes which root at the nodes. Because of the short internodes, a mature stand of Japanese sedge is usually dense, with almost complete ground cover. This cool season plant remains green well into fall and can tolerate some, but not continuous foot traffic.

'Sea Isle' tends to be long-lived on stable sand dunes, a trait that American beachgrass lacks. In addition, Japanese sedge appears to be less subject to damage from pest and low fertility. Consequently, Sea Isle may exist under a lower management level than American beachgrass. However, it will flourish under high levels of management such as routine fertilization and protection from pedestrian or vehicular traffic.

During the establishment year, Japanese sedge may have a high mortality rate and exhibit little spread. However, after the first critical year, stands tend to improve continually in both vigor and density.

The plant was released in 1983 by the Soil Conservation Service and the New Jersey Agricultural Experiment Station. Limited quantities of plants are available for commercial production.

3. 'Cape' American beachgrass (Ammophila breviligulata)

'Cape' was released for commercial production in 1972. It is a superior strain of American beachgrass being used along the mid-Atlantic coast for initial stabilization and establishment of sand dunes. Cape is robust easy to plant and spreads rapidly by vigorous rhizomes. It has healthier leaves and thicker culms or stems than common American beachgrass. An adequate supply of Cape beachgrass plants are available for commercial production.

4. 'VA-70' Shrub Lespedeza (Lespedeza thunbergii)

'VA-70' shrub lespedeza is a herbaceous legume with a semi-woody stem. It is an upright perennial and its stems grow 4 to 6 feet tall. The leaves are more linear than oval and they are about 2 inches long and one-half inch wide. Attractive pink to purple flowers appear in late summer. It is an excellent source of food for wildlife. Pheasants and bobwhite quail use its seed for food in fall and winter. Rabbit and deer browse the leaves and bees produce honey from the flowers.

You can use VA-70 shrub lespedeza almost anywhere that shrubs are appropriate. When used in hedges and borders, VA-70 is an attractive landscape feature. The plant is particularly well suited to seeding steep banks along channels and ditches or for wildlife borders along these water courses. It is useful as a border between cropland and woodland, as contour hedges between crop strips, along diversion terrace boundaries, and in small odd areas set aside for wildlife.

VA-70 shrub lespedeza can be used alone or with other plants. An adequate supply of seed is available for commercial production.

5. 'Emerald Sea' Shore Juniper (Juniperus conferta)

'Emerald Sea' is a low-growing or trailing evergreen shrub about 1 foot high. Its pale evergreen needles are greenish blue, softer than most junipers, and one-half to 1 inch long. The needles retain their blue-green color very well during the winter, and mass plantings produce a dense and uniform ground cover.

Shore juniper is well suited for planting on sand dunes near the seashore where other junipers do not grow successfully. It has good salt tolerance and grows well in sandy soils.

Emerald Sea is often used for mass or border plantings around buildings and as foreground for taller plant groups. It is also a versatile ground cover plant for steep banks around buildings, parks, and playgrounds.

An adequate supply of unrooted cuttings are available for commercial production. Potted plants are available in small quantities.

6. 'Rem-Red' Amur Honeysuckle (Lonicera maackii)

'Rem-Red' is a multi-stemmed, vase-shaped shrub that grows to a height of 8-12 feet. The plant is well suited for ornamental use or as a screen on large lots. Its primary use is to supply a source of food for wildlife during the critical winter period.

The plant's bright red fruit is about one-fourth inch in diameter and matures in late September and October. Amur honeysuckle grows best on deep, well-drained soil. The plants grows well in slightly acid soils with a sandy, loamy, or moderately clayey texture.

Rem-Red was released in 1970 as a multi-purpose plant. An adequate seed supply exists for commercial production.

7. 'Avalon' Saltmeadow Cordgrass (Spartina patens)

'Avalon' is a strongly rhizomatous salt tolerant perennial grass that grows up to 2 1/2 feet tall. Its rhizomes are long and slender and are responsible for producing most of the new growth.

Avalon is unique in that it has the ability to spread quickly and produce a more dense root system and finer roots than most other saltmeadow cordgrass strains.

The principle conservation use of Avalon is to vegetate and restabilize brackish and fresh water tidal streambanks. It is salt tolerant and can be established immediately above the high tide elevation. It is well adapted to sandy to clay soils, will tolerate occasional inundation by storm tides and has the capability to trap and grow through thin layers of sand. Avalon is, also, adapted to low elevation coastal sand dunes and can be used to supplement other sand dune vegetation.

For establishment, both potted and bare-root plants can be used. An adequate supply of bare-root plants is available for commercial production.